GOVERNMENT OF INDIA
ARCHÆOLOGICAL SURVEY OF INDIA
ARCHÆOLOGICAL
LIBRARY

ACCESSION NO. 22381
CALL No. 069.09(5414)/I.M.

D.G.A. 79.

OFFICE OF THE DIRECTOR GENERAL OF ARCHAEOLOGY.
Library Regr. No
* INDIA. *

For the years 1909-10
" " 1910-11

4.7.10

D 452 8°

Annual Report
of the
# Indian Museum
# Industrial Section
for the year 1909-10

(87)

OFFICE OF THE DIRECTOR GENERAL OF ARCHAEOLOGY
Library Regr. No. 8410

A.L.2440

D452
79

ANNUAL REPORT
OF THE
INDIAN MUSEUM,
INDUSTRIAL SECTION,
1909-1910.

No. 23-X.

From

I. HENRY BURKILL, Esq., M.A.,
Acting Superintendent, Indian Museum,
Industrial Section,

To

The TRUSTEES, INDIAN MUSEUM,

Dated Calcutta, the 22nd April 1910.

(87)

Sirs,

I have the honour to forward to you the Annual Report of this Section of the Museum, which is divided into parts as follows:—

I. Administration, p. 2.
II. Mr. Hooper's report on the Laboratory, p. 26.
III. Statements showing the heads of expenditure for the past five years, p. 39.
IV. Chief additions to the Economic Court, p. 42.
V. Additions to the Artware Court, p. 49.
VI. Additions to the Ethnologic Court, p. 52.

069.09 (5414)
I.M.
22331

I.—Administration.

I have departed in this report slightly from custom in that I have included under the heading 'Administration' all the information that I have to give regarding the galleries except the lists of additions. I have done this because long tabular statements often prevent readers from reading to the end of a report, and may therefore be, as in this case, more appropriately given in appendices, the more descriptive matter with which formerly they were given being brought into the body of the report.

I have acted as Superintendent of the Section throughout the year. Mr. Hooper was absent from the 22nd April, 1909, to the 21st October, 1909, on six months' leave to Europe, and during that time Babu Bidhu Bhusan Dutta, Demonstrator in Chemistry at the Presidency College, held charge of the laboratory and carried on the work devolving on the Curator. Mr. Vieux, the Assistant Curator, was at his post from the commencement of the period under report until 8th January, 1910, when his services were lent—first to the Government of the Central Provinces for the arranging of the Nagpur Museum, and afterwards to the Reporter on Economic Products. Babu Benode Behari Mukerjee acted in his place from the 9th January, 1910, to the end of the financial year. Near the close of the year Babu Phani Bhusan Dutt, Clerk in charge of the Art Court, and latterly for a time acting Assistant Curator, retired from Government service at his age limit, after 33 years of thorough and ungrudging work. I count it no less than a duty to thank him here publicly for his work.

All three galleries were opened to the public throughout the year except at the usual spring and autumn cleanings.

We closed the financial year under review after exercising the greatest economy with an unexpected balance for general purposes of Rs. 323-12-1. Nothing had been spent on new books, nothing on new show cases, and the greater part of the balance arose from a reduced expenditure in the Chemical Laboratory.

On pp. 39 to 41 may be found tables analysing the cost of upkeep of the Section for five years. Similar tables were given in the Report for 1905-06.

We close the year with Rs. 1,229-9-0 in hand from the additional grant for the purchase of Artware. The additions to the Art Court are detailed on pp. 49 to 51. The most beautiful additition to the collection is an enamelled hukka (No. 12,931): it is to be counted one of the finest pieces of work ever produced by the extinct School of Lucknow enamellers. A vase of carved and damascened steel (No. 12,937) acquired in Calcutta happens to be the first piece of carved steel placed in the Museum. The brass collection and the collection of wood carving have been much enriched by the samples of Nepalese work selected for the Museum by Lieutenant-Colonel J. Manners-Smith, v.c., the Resident in Nepal: the wood carving consists of copies of famous windows in Khatmandu and Pátan. Very many thanks are due to Colonel Manners-Smith for the trouble that he has taken on behalf of the Museum. Some

22381.
30.1.56.
069.09(5414)/I.M.

marvellously fine ivory carving is to be seen on the new exhibit No. 12,932, a miniature shrine of Buddha from Samding, or its neighbourhood, in Tibet.

As Reporter on Economic Products, I have made over to the Ethnologic Gallery a long series of iron styles which the Government of Madras had kindly collected for me. These styles have been described in the *Journal of the Asiatic Society of Bengal*, 1910, pp. 1—18, with two plates. In the Economic Court a case has been allotted to the reed pens of India, which were described in the Agricultural Ledger No. 6 of 1908-09, pp. 111---130.

The condition of the collections is satisfactory except that the Section is in need of more space. The statistics on p. 41 show that our expenses on naphthaline for their preservation have of recent years increased.

We have come now to a parting of ways, whence the three galleries that for nineteen years have constituted the Industrial Section of the Indian Museum will pass into as many different charges. They have outgrown the conditions under which one officer could do them justice; and, although the new arrangement will take from under my charge galleries wherein I find great interest, I have been very anxious for the passing of the "Indian Museum Act, 1910,"[1] that the separation might follow. As this is perhaps the last time that I shall report on the state of the collection of Artware and of Ethnologic specimens, I take the opportunity of saying a little about the history of the collections, because there is considerable ignorance in India regarding them, and very largely to show how they have been catalogued.

---

[1] Passed March 18th, 1910.

INDUSTRIAL SECTION FOR 1909-1910.

It was in 1814, on a proposal made by Dr. Nathaniel Wallich, Superintendent of the Honourable East India Company's Botanic Garden at Sibpur, that the Asiatic Society started a Museum. The Society used to record donations to it in its publications; thus the first list of presentations is to be found in the *Asiatick Researches*, xii, 1816, pp. xx—xxvii. The first donor named is the Countess of Loudon; and her gift was of stuffed birds and a mineral. Then follow the name of five others whose gifts were of like description. The seventh entry is "J. Brown, Esq., a set of side arms belonging to the inhabitants of Napaul, consisting of one cutlass, a knife, and a steel and flint for striking fire, in a leathern case." Two of Mr. Brown's gifts are in the present Ethnologic Gallery of the Museum under the Nos. 3043 and 3043-1, and a third seems to be No. 5551. Further entries follow in this first list of acknowledgments, the objects given being Zoological, until we came to a long list of gifts from Robert Home, the artist, among which occurs "a brass standish and pen case:" this is No. 3065 in the present gallery.

In the succeeding volumes of the *Asiatick Researches* list follows list: and they are easily found, but are often very bald of information, so that the student gets little good by turning them up. However the gifts are all recorded.

I cannot tell when the Society opened its Museum to the public; but it could furnish it with no expert staff but a voluntary one, unequal to exercising efficient control; so that the exhibits passed into decay, and in 1835 was the

Museum reported as being dark, damp and dirty (vide *Journal of the Asiatic Society*, 1836, p. 250). To meet the reproach the Society then appointed a Curator on a small salary. Especially had the Natural History specimens been very neglected, and four-fifths were thrown away. The new Curator divided the Museum into "Art" and "Nature." And no doubt did much to improve it: yet two years later it was reported as still unsatisfactory.

The *Journal of the Asiatic Society* from 1856 onwards records the number of visitors who used the Museum: thus in 1859 the numbers were 142, and in 1861 they were 273 per diem.

Between 1849 and 1868 the Asiatic Society printed the six catalogues of its collections:—Curiosities by Rajendra Lala Mittra, 1849; Birds by E. Blyth, 1849; Fossil Vertebrates by H. Falconer and H. Walker, 1859; Shells by W. Theobald, 1860; Mammals by E. Blyth, 1863; and Reptiles by W. Theobald, 1868.

With the first of the catalogues alone am I concerned. It enumerates 7 busts, 81 pictures, 130 weapons, approximately, 490 manufactured objects of industrial service, 41 raw economic products, 66 musical instruments, 370 images of brass or stone, 32 of architectural objects, and a series of inscriptions and manuscripts. The numeration in the catalogue starts at 1 thrice: but, in spite of the frequent triplication, its numbers were used as registration numbers in the Society's collection.

In 1868 the Asiatic Society caused their six catalogues of its collections to be revised in manuscript.[1]

---

[1] The revised copies were transferred in January 1877 to the Trustees of the Indian Museum and are preserved in the Natural History Section.

The volume on Curiosities contains the new articles written up, under intercalary numbers, *e.g.*, 467*a*, 467*b*, 467*c*, etc.

The total number of entries in the catalogue stands at—

busts	7—(no accessions) :
portraits and pictures	81—(no accessions) :
armour and weapons	370—(240 accessions) :
manufactured industrial objects	725—(235 accessions) :
raw economic products	55— (14 accessions) :
musical instruments	68— (2 accessions) :
images of brass and stone and architectural objects.	641—(239 accessions).

Against all the old entries in the revised catalogue are marks indicating whether the specimens had been lost or destroyed or were still forthcoming. It is recorded thus, that of weapons, no less than 90 of those possessed before 1849 were lost : of manufactured industrial objects, 106 had been lost : 20 of the raw economic products ; 37 of the musical instruments; and 48 of the images. But the figures are not accurate ; for many recorded as lost were really not identified and had been entered in the catalogue as accessions (*vide* Trustees' report for 1883-84, p. 1 of Superintendent's report). The revised catalogue tells us that the 'curiosities' left in the Museum were in number about 1,646 : we do not call them curiosities now, but Ethnological and Archæological specimens.

In 1857 the Asiatic Society had put a proposal before Government for "the foundation at Calcutta of an Imperial Museum to which the whole of the Society's Collections, except the Library, might be transferred" (*Proc. Asiatic Soc.*, 1857, p. 232). The Government approved the proposal in May 1862 after hesitation. It was evidently to further the transference that the 1868 catalogue was prepared, for on two copies of it, very slightly altered, the Asiatic Society made over, in January, 1877, and the Trustees of the Indian Museum received, the Society's collections, with the exception of busts, pictures and manuscripts which by agreement were to remain with the Society. A much later catalogue, to which I shall presently refer, leads me to place the total number of Ethnologic specimens made over at 906, the rest of the 1646 being archæologic specimens.

In 1872 Sir George Campbell, then Lieutenant-Governor of Bengal, took up warmly a suggestion made by Mr. Justice Phear that a Bengal Economic Museum should be started.

Sir George Campbell at first proposed to locate it at Alipur, in the corner of the Belvedere grounds towards Woodlands: but after discussion, on December 15th, 1873, it was located in the Customs House godowns abutting on Dalhousie Square, where it remained until 1879. In 1879 it was moved to No. 12, Hastings Street, a house at the corner of Hastings Street and Strand Road, unfortunately far too small for it.

The Bengal Economic Museum's collection was carefully catalogued in eleven general registers and thirteen classified registers. The specimens were got together very largely by the agency of district committees all over Bengal and Assam, and consisted of raw products and manufactures. On December 31st, 1874, 2,217 specimens had been received and catalogued: one year later, 4,405: again at the end of 1876, 8,586; at the end of 1877, 12,140; of 1878, 13,382; of 1879, 13,745; of 1880, 13,937; and of 1881, 14,519.

An idea of the nature of the Museum can be got from H. T. Prinsep's extracts from the anunal reports printed in 1880, under the title "The Economic Museum, Calcutta." We learn that in 1878 it occupied four halls; and another was being built for it in order that jail manufactures might be shown: and there was at that time a proposal made that the products of Burmah should be added.

There was no published guide book to the Museum, but the Committee in 1880 wished to make one; and before this, in 1879, a grant of Rs. 1,000 for an illustrated book on its drug collections had been given by the Government of Bengal. The preparation of that book was entrusted to Dr. Kanny Lall Dey, but ill-health prevented its completion.

The removal in 1879, carried out in little over a month, that the East India Railway might have the godowns for offices, threw the collection into great disorder, and the Museum had to be closed for a time. Passing on to the year 1882 and returning to Chowringhee, the reader may be reminded how the Trustees of the Indian Museum were there in possession of the Asiatic Society's collections, including among them those on which this report alone touches, *viz.*, Ethnology and Raw Products. A catalogue was then compiled with a running number, enumerating both the collections of the Asiatic Society and the additions, and this catalogue, which is preserved in the Industrial Section of the Museum, shows what were the 906 Ethnological specimens obtained, by the Museum from the Asiatic Society.

The additions already made to the Trustees to this nucleus of an Ethnologic collection were considerable; they had all been acknowledged in the Museum reports; and the year 1882 found Trustees building show cases for the collections. To the Economic collections the Trustees had not added, nor were they on exhibition; for, as is explained in their report for 1882-83, p. 9, the primary engagement made at the time of the transfer of the Asiatic Society's collections had been for the exhibition and preservation of objects of Natural History and Archæology, and the Museum building had not space for more. However, the Trustees were quite willing to consider the formation of an Economical collection if more space could be given to them (*vide* Trustees' Minutes, Report for 1882-83, p. 11).

Now in this year 1882 the Government of Bengal approached the Trustees, asking them if they would lend the Museum for the purpose of an International Exhibition, and held out an offer as one inducement that they would in return extend the north galleries of the Museum. To this the Trustees acceded, and at the same time made other agreements, out of one of which the red brick Art Gallery (now happily demolished) was built along Chowringhee, to serve as a Court for jewellery at the Exhibition; and afterwards it became the permanent home of the Bengal Government's Art collection.

The Bengal Economic Museum at No. 12, Hastings Street had been reopened to the public on July 24th, 1882: Neglect in the years since it was moved to Hastings Street had destroyed much in it. The Bengal pottery specimens had been allowed to lie in heaps in corners among decaying packing cases: the stock of bottles had long been exhausted, and new exhibits were not properly put up for exhibition (*vide* Report in manuscript preserved in the Industrial Section of the Indian Museum). This wreck of a large collection [1] was summarily transferred by the Lieutenant-Governor to the Exhibition.

Most of the objects detailed are raw products and simple manufactures such as Bengal and Assam produce, and nearly all are from these two provinces.

A visitors' book used in the old Bengal Economic Museum is preserved in my office: it contains signatures from January 19th, 1877, to July 8th, 1879, and from July 24th, 1882, to April 9th, 1883. I think that it records faithfully the date of the closing of the Museum in the Customs House, and its duration as a public place in Hastings Street.

The Calcutta International Exhibition was opened on the 4th December 1883. It occupied the Indian Museum, the Art Gallery, an adjoining building, three rows of temporary sheds south of the Museum, and the greater part of the triangle of the Maidan opposite to the Museum. The preparations for the Exhibition of Ethnology in the Museum had been stayed in order to surrender the Ethnological Gallery to the Exhibition authorities: and the collections were meanwhile quickly put together for the Exhibition, but in an out building temporarily. The Economic Court of the Exhibition was a temporary structure on the Maidan (*vide* Q on plan in the Official report, part 1, p. 26, and for its exhibits, *vide* T. N. Mukharji's list in part 2). The following collections found a place in that Court :—

---

[1] Its catalogue which had been well kept is now bound in seven volumes in the Industrial Section.

(1) The entire collection of the Bengal Economic Museum ;
(2) Collection of Ecomomic Products and Indian Art-ware made by the Revenue and Agricultural Department of the Government of India ;
(3) Collections of products contributed by private individuals ;
(4) Trade samples supplied by the various Indian Chambers of Commerce, and Merchants ; and
(5) A small series of Ethnological specimens purchased or loaned.

The collections of Indian Artware got together for the Calcutta Exhibition at the cost of the Bengal Government by Sir Edward Buck with Sir George Watt helping, were most extensive, and in 1885, after the close of the Exhibition, it was arranged that these extensive collections should be put under the administration of the Trustees, *i.e.*, they were to be deposited in an additional wing of the Museum, but to remain the property of the Government of Bengal. The Museum profited also at the same time because numerous and extensive donations of industrial objects had been presented to it at the close of the Exhibition by foreign exhibitors (*vide* Trustees' report 1883-84, p. 10). In order to make it legal for the Trustees to administer the Bengal Government's collection, it was necessary that a second Indian Museum Act should be passed as the first had no provision whereby the Trustees could administer collections not their own property: and the Act was passed in 1887. The fate of the collections during the three years from the close of the Exhibition to the passing of the Act has to be told.

After the Exhibition some of the temporary buildings on the south of the Museum were left standing, that they might hold the collections. Thither the collections were taken and in a considerable measure rearranged, so that the old Bengal Economic Museum, with the exception of a few Zoological specimens which had found their way from the Exhibition appropriately into the Natural History Section of the Indian Museum, reopened as a subsidiary Museum to the Indian Museum. I do not know exactly when the subsidiary Museum opened, but its record of visitors from August 1st, 1886, to April 30th, 1887, is preserved in my office, showing that over that time at least it was open.

The Trustees of the Indian Museum, in anticipation of the collection of the Bengal Government coming under their administration, allowed in 1885 their own collection of Ethnologic objects to be shown along with it, the two grouped into one series but distinctively labelled. About 3,700 specimens formed the Museum's collection and 2,817 that of the Bengal Government. For a description of their state of arrangement the reader may turn to the Museum Report for 1886-87, pp. 25-26: he will read: "the Ethnologic collections are decidedly incomplete, as might be expected from the manner in which they have been obtained .... and as regards the state of the collections, it must be remembered that at first for many months all the articles belonging to the Bengal Government were exposed freely to the air, to the dust, etc., in temporary sheds, and it is only lately that they have been provided (even now partly and not entirely) with glass cases. The Imperial Museum Ethonological collection has met with rather hard treatment in recent years, as it has been subject to several removals, and was also stored for some time in closed rooms without receiving continued supervision."

After the passing of the Act the Trustees reported on their new accession as follows (Museum Report for 1886-87, pp. 10-11.) :—

"The Trustees .... feel that they enter upon their new duties under somewhat discouraging circumstances, and that until suitable accommodation and scientific supervision are provided for the additions now made to the collections under their charge, they will be able to do but little towards effectively carrying out the objects of the Trust by properly arranging and completing the new collections in a systematic way, that will meet the wants of the scientific enquirer as well as of the merchant or manufacturer, besides providing for the instruction and recreation of the general public.

"For the development of the Economic, Industrial and Artware collections, the knowledge and experience of Indian economic products and industrial arts possesed by Babu T. N. Mukharji, the newly appointed Assistant Curator, will no doubt, prove most valuable, but the Trustees hesitate to proceed with any complete scheme of re-arrangement, involving a considerable expenditure of money, as well as of time and labour, so long as these collections have to remain in the temporary Exhibition sheds, exposed to rapid deterioration for want of proper protection from dust, heat, and rain, and liable, at any time, to be completely wrecked by the occurrence of a cyclone. The Artware and Industrial collections in the Chowringhi annexé are better protected, but space is required for extension, and it is exceedingly difficult to keep the specimens of carpets, durries, woollen and other fabrics, many of which are hanging high on the walls, free from attack by vermin.

"The Ethnological collections, in the masonry buildings forming part of the quadrangle of the old St. Paul's School, and more lately occupied by the Bengal Secretariat Press, are well protected, but, for the most part, are very crowded in small rooms and passages, and are also incomplete. It is hardly possible to complete them, or better to arrange them, so as to give readily a good general idea of the principal races and tribes inhabiting the different parts of India, and more particularly of Bengal and Assam, their ways of living and indigenous arts or manufactures, until additional protected space is available."

At length in 1888 the Government of Bengal was able to commence the construction of the wing which it had in 1882 undertaken to erect. The wing was finished in 1891. Immediately it was finished the removal into it of the collection was commenced. The Art Gallery was ready first and was opened to the public on September 1st, 1892: the Ethnologic Gallery was ready next and was opened to the public on January 1st, 1893: but nothing immediately could be done to get the Economic collection into a fit state for the Exhibition. That these two galleries were got ready so quickly was evidently due in a great measure to the orderly arrangement into which they (Bengal Government collections) had been got by Mr. (now Sir) Alexander Pedler in the interval between the close of the Exhibition and the taking over of the collection by the Trustees on April 1st, 1887, to Mr. T. N. Mukharji having made himself an authority on Indian Art, and lastly to the appointment of Mr. E. Thurston, Superintendent of the Central Museum, Madras, to the charge of the Section. As far as I can make out, Mr. Thurston opened the Art Court with 11,075 objects and the Ethnologic Gallery with 7,574. He arranged the Ethnologic Gallery so as to show the habits and civilisation of the people in various parts of India.[1]

In his Report for 1892-93, p. 3, he called the Ethnological collection "an excellent nucleus collection, capable of and demanding very considerable expansion." It did thereafter very considerably expand, so that when Sir George Watt returned from leave on November 23rd, 1893, and took over charge of the Economic and Art Collections from Mr. Thurston it contained 8,377 specimens. Sir George Watt's first act in the Museum was to start serial registers. He caused to be made that register which shows the number of specimens in the Art Court as mentioned above to have been 11,075 at its opening; and in 1894 he commenced a register of the Ethnologic Court which runs to 5,700 numbers, but was soon superseded by another still current. This current catalogue enumerates, as Nos. 1—2911, specimens received from the Calcutta Exhibition, and from 2912 to 6972 specimens, the Nos. 1 to 5466 of the superseded catalogue being what were received from the old Indian Museum collection, including the specimens of the Asiatic Society's Museum. During the few preceding years Exhibition after Exhibition in Europe and elsewhere had demanded specimens of Indian produce, and had been supplied with collections. Much of the work thereby created had latterly fallen on the officers of the Economic Museums in Calcutta: sometimes the collecting of new material had partly replenished the stocks in the Museums—more often it has hampered their advancement by causing additional work. But finally the preparation of one permanent exhibit, that of the Imperial Institute in London, wafted a genuine opportunity into the way of the Indian Museum, causing such extensive collections to flow through it that the present Economic Court is chiefly what it is by reason of them.

---

[1] A case-by-case catalogue preserved in the Industrial Section shows exactly what was Mr. Thurston's arrangement.

Sir George Watt found the Economic Court to possess many thousands of specimens, most of which were unfit for further exhibition. Time and undue exposure to climatic influences had destroyed most of them. He preserved about 500 specimens, mostly hand specimens of timbers, and started a serial catalogue of additions. Somehow into this catalogue the five hundred specimens preserved from the old Bengal Economic Museum collections were never entered, and the catalogue begins with those obtained for the Imperial

Institute. It shows that Nos. 1—1195 of the specimens in the Court were duplicates of material collected under Mr. T. N. Mukharji for the Institute in 1891, and Nos. 1196—4597 of material collected by Mr. Thurston for the same purpose, and that Nos. 4598 on were collected by Sir George Watt. The Economic Court was opened to the public on May 29th, 1901, when the registers had recorded 15,185 specimens.

Its growth has been very rapid. In my report for May 1903-04, I gave a table showing a growth of 16,980 specimens in the ten years from 1894-95. I now bring that table up to date. The growth of the other galleries may conveniently be given in it also :—

	Economic Court.	Artware Court.	Ethnology Court.	TOTAL.
1904-05	935	12	172	1,119
1905-06	701	72	309	1,082
1906-07	678	30	16	724
1907-08	934	48	79	1,061
1908-09	832	25	60	917
1909-10	654	50	229	933
Annual average . . .	789	39	142	972

In 1900 the Government of India came into possession of the Government of Bengal's rights over the collections which it had made; so that the Museum was imperialised. The Museum Conference of 1907 held that it ought to be the one Imperial Museum for India.

In 1902 the title of the Section was changed from 'Economic and Art' to 'Industrial.' In 1907, under Mr. Vieux's supervision, a case-to-case catalogue of the Ethnologic Court was made; and the entries in the general register checked: 87 specimens had to be destroyed as they had perished, 105 entries had to be remade: and 2,253 specimens were no longer in the Court, having been removed for various reasons, chiefly to the Art Court. The total number of specimens actually in the Ethnological Court at the present time is thus found to be 8,639.

A case-to-case catalogue has also been made by Mr. Vieux for the Economic Court; and one commenced for the Art Court; but on account of the probable transfer of the Art Court it was not worth while to proceed with it to the delay of other work. The Court has therefore not been checked: but the registers show 1,209 withdrawals, and therefore, as the last registered number is 12,945, the presumed total of the collection is 11,736 specimens.

This is the history of the three collections now passing into different charges. The Ethnologic Gallery contains the oldest specimens, some of them having been deposited in the Asiatic Society's Museum in 1814. About 906 specimens passed from the Asiatic Society to the Trustees of the Indian Museum; the Trustees built up the collection to about 8,700 specimens in 1885, when 2,817 more were added from the Bengal Economic Museum. The collection had then taken a decidedly local bias, which it still has in measure. It was exhibited to the public by the Asiatic Society for at least twenty years before it was transferred to the

Museum. Then for some years it could not be exhibited. It was partly on exhibit during the Calcutta Exhibition, and then again in 1886 and 1887. It found its present location in 1888, and was under arrangement for three and a half years. It was again on exhibit in 1892, and has been on exhibit permanently since that date. It has had four different numerations in its catalogues: firstly, that of the Asiatic Society; secondly, that of the 1881 catalogue; thirdly, that of Sir George Watt's obsolete 1894 catalogue; and lastly, it obtained its present catalogue in 1894, under Sir George Watt. This catalogue now runs to 10,874 numbers. It refers him who consults it back to the old numbers so that the origin of specimens is traceable. What the gallery now requires is a descriptive catalogue; and to write that demands the whole time of a competent Ethnologist. A printed descriptive catalogue of the collection would be invaluable.

The Art Gallery contains a very small nucleus of pots and pans of Bengal manufacture which had been gathered into the Bengal Economic Museum: to that nucleus the Bengal Government added the very large collection of objects got together for the Calcutta International Exhibition. From 1902-03 onwards, owing to the personal interest which Lord Curzon took in the Court, a grant of Rs. 6,000 per annum has been available for the purchase of additions, and some of its best objects have been obtained recently with this grant. The responsibility of the spending of this grant and the fact that its possession put finer works of art within the means of the Trustees than formerly, are strong reasons for transferring the collection from the charge of an Industrial Officer to that of an Art Officer. Therefore is the **Art** collection to be shed off from the Industrial Section. It, too, badly needs a descriptive catalogue.

When Ethnology and Art shall have been shed off, the collection of Economic Products will remain in constituting the Section alone. What I have said above of the perishing of the Asiatic Society's specimens of raw products, of the perishing of those of the Bengal Economic Museum, and of the perishing of those of the Calcutta International Exhibition, has been said to indicate what constant attention and careful protection from the climate raw products need, especially when it has to be an advertisement. The care of this Section is not less than one officer's charge.

Proposals for the readjustment of staff, allowances, etc., have already been submitted, together with a plan in outline for the arrangement of the Section.

The origin of the various collections is thus seen to be diverse. They were brought together under a common roof in 1888 as being intimately connected with the life of man, and so capable to being brought into one view. Sir George Watt's rearrangement of the Ethnologic Court by the nature of the specimens was an attempt to bring the Court into line with the Economic Court: that is why he could not accept Mr. Thurston's arrangement. The three collections being one charge, and owing to the inelasticity of Museum galleries, the separating lines between the three groups of objects have not been rigorously observed: an overflow of what legitimately belongs to the domain of the

Economic collection has occurred into the galleries of Art and Ethnology. Consequently on the transfer of Ethnology and Art some withdrawals must be made from those two galleries to fit up the new Industrial galleries. The incorporation of the withdrawals must crowd something out of the public Economic gallery, and I have already in my Report for 1907-08, p. 5, indicated what is the course to take.

CHRONOLOGIC TABLE.

1814 Asiatic Society's Museum founded: Wallich its first Honorary Superintendent.

1815 Wallich removed to Sibpur and William Lloyd Gibbons, the Society's Secretary, made Joint Superintendent.

1835 Museum in disorder.

1837 Growth of Museum put the Society into financial difficulties; and on a Memorial, drawn up by Sir Edward Ryan, the East India Company gave a grant-in-aid.

1847 Complete catalogue of Curiosities prepared by Dr. Rajendra Lala Mitra.

1849 Catalogue of Curiosities printed.

1856 The Government proposed that the Society should transfer its Geological collections to the Museum of the newly founded Geological Survey; but the offer was declined.

1857 Project for an Indian Museum set forward by the Asiatic Society.

1862 Project accepted by Government.

1868 Asiatic Society's Catalogue revised.

1872 Bengal Economic Museum proposed.

1873 Bengal Economic Museum founded in the Customs House godowns abutting on Dalhousie Square.

1877 Asiatic Society's Museum transferred to the Indian Museum.

1879 Bengal Economic Museum removed to No. 12, Hastings Street, and closed.

1882 Bengal Economic Museum reopened for a few weeks, then abolished.

1883 Museum closed in September; and Calcutta International Exhibition, including Museum and collections of Bengal Economic Museum, opened in December.

1884 Exhibition closed in March, and Museum reopened in September.

1885 Ethnologic Collections of Museum combined into one series with those from Exhibition. These and other Bengal Government's collections on view in annexés to the Museum.

1887 Bengal Government's collections put under administration of Trustees of Museum.

1888 North wing of Museum commenced.

1891 Collecting Economic Products for the Imperial Institute and Indian Museum started.

1892 Ethnologic gallery in North wing opened to public.

1893 Art Gallery in North wing opened to public.

1894 Present catalogues of the Section commenced.

1900 Indian Museum as a whole Imperialised.

1901 Economic Gallery in North wing opened to the public.

The following firms have been so good as to renew their exhibits in the Economic Court :—Messrs. Kllburn & Co., Messrs. Barry & Co., Messrs. Thomas Duff & Co., Messrs. Shaw, Wallace & Co., of Calcutta, and Elgin Mills Co., Cawnpur. I take this opportunity of thanking them.

I am trying the experiment of doing without a permanent carpenter, and spending the salary of the post on intermittent Chinese labour, because Rs. 20 per mensem does not attract a reliable man.

In February 1910 the indigo factory model was sent to London by the request of Sir George Sutherland, his firm having been the donors, that it might serve as an advertisement for indigo in India at a small Exhibition, to be held at Harrod's Stores. Until its return a series of dyed fabrics has been put into the empty show case.

Two enlargements of photographs were specially made for the Court representing an Agave and a Cardamom garden. The negatives were taken by the Reporter on Economic Products on tour.

Expenses connected with the Library have been confined to bookbinding. Three hundred and eighty books or pamphlets were received by gift or exchange. We now exchange the Museum Report with other kindred Museums, and it is intended to give to other Museums the Report and reprints of any notes descriptive of the collection such as that on Iron Styles now being published by the Asiatic Society.

The work of the staff has been satisfactory.

I have the honour to be,
Sirs,
Your most obedient servant,

I. HENRY BURKILL,
Acting Superintendent.

22381

II.—WORK OF THE LABORATORY.

BY MR. D. HOOPER, F.C.S.

The work of the Laboratory has been maintained during the year. I availed myself of six months' combined leave from the 22nd April; during it Babu Bidhu Bhusan Dutta, M.A., of the Presidency College, officiated. Babu Surendra Nath Dey continued as assistant. Babu Adhar Krishna Bose worked voluntarily in the Laboratory for nearly the whole year, and then was appointed to a post in the Agricultural Institute at Pusa. Four other Government Departments besides the Reporter on Economic Products have referred enquiries to this office for chemical investigation.

The work of the Department shown by the number of analyses continues to increase. Three hundred and forty samples were examined in 1907-08, 390 in 1908-09, and 444 during the year under review.

The materials examined are arranged under the following groups :—

Natural exudations	51
Oils and oil seeds	141
Dyes and tans	78
Fibres and papers	144
Medicinal products	13
Food stuffs	9
Minerals	8
	444

Bees'-wax.—A firm of wax contractors in London wrote to the Reporter on Economic Products on the subject of wax adulteration in India. It was reported that a great deal of the yellow wax arriving from Bombay was grossly adulterated with paraffin and other wax as not to be worth one-half of what was asked for it. During an enquiry made by this Department five years ago on the subject of the composition of Indian bees'-wax it was found that local samples had a uniform composition differing from that of foreign samples, and that the few adulterated specimens were those procured from large towns as Bombay, Simla and Lucknow. The Director of Agriculture of Bombay was kind enough to obtain from the Collector of Customs various samples of bees'-wax prepared in Bombay for export. These were submitted to analysis, and it was found that only one of the fourteen samples could be considered genuine. The presence of large quantities of paraffin wax considerably lowered the acid, saponification and iodine values and affected the specific gravity and melting point. There is evidence that the sophistication of the bees'-wax takes place at the port, and the practice has for some time had a detrimental influence on the trade. The London contractors inform us that Calcutta exports much better wax; one brand in particular is well bleached and commands a higher price in the market than any other.

Cotton Seed Oil.—Correspondence has taken place with the Director General of Commercial Intelligence with regard to the utilisation of cotton seed oil. The chief problems for solution were (1) the proportion of stearin or solid fats present in oil expressed from Indian grown seed; (2) the nature and amount of the acrid and colouring principle;

and (3) the practicability of using the oil for edible purposes. Samples of the oil obtained from American seed grown at Dharwar and expressed at Cawnpur were obtained for experiment. At the winter temperature of Calcutta (22°—24° C.) very little stearin is deposited by this oil, but by chemical methods 29·5 and 32·4 per cent. of solid white fats were separated from two different samples. Previous investigators have found from 22·3 to 32·6 per cent. of solid fats in commercial cotton seed oil. Dr. Lewkowitsch quotes some recent analyses in which the proportions of solid fatty acids in American and Egyptian cotton seed varied from 20·9 to 24·4 per cent. From these results we may conclude that just as much if not more stearin could be obtained from Indian oil. The separation of the solid fat would of course not be so easy a matter in India than it would be in temperate climates.

As regards the acridity of crude cotton seed oil it is evident that this is intimately associated with the reddish brown colouring matter or bloom. No figures are available for showing the amount present in other oils, but the acid value of two kinds of oil from American seed from Dharwar gave respectively 7·5 and 9·7 per cent. By using a corresponding amount of alkali expressed by these figures and subsequent washing, the colouring matter, bloom and acridity are entirely removed, and a refined oil obtained having the same yellow colour and other properties of the Egyptian refined oil. The objectionable features of Indian cotton seed oil are removed by this method with very little loss on the bulk of the oil. Most of the edible cotton seed oil made in Britain is prepared from Egyptian seed. Indian cotton seed oil is said to have a disagreeable flavour either due to the excess of fibre in the seed or the condition of the seed when it arrives at the factory; the refining of the Indian oil is also said to be more costly than Egyptian. From the above experiments it would appear that with very careful screening of the seed before crushing and by washing the oil thoroughly in the process of refining a perfectly edible oil could be produced for local use.

Soy Beans.—The interest that has lately been taken in Soy beans and oil has prompted this Department to examine the beans grown in India. The Reporter on Economic Products, through the Directors of Agriculture, has called for samples from the chief districts where they are grown. Ninety-one samples have been received from Burma, Naga Hills, Shillong, Kalimpong, Kangra, Simla, Kashmir, Patna, Nagpur, Poona and 37 villages of the United Provinces. The oil content ranged from 13·5 to 22·4 per cent., the Poona samples yielding the highest amount. As far as the yield of oil is concerned, Soy beans cultivated in India afford almost as much as is found in those from Manchuria and Japan. Only certain localities in India are suitable for growing Glycine, and these are upland situations in Burma, Assam and the lower valleys of the Himalaya.

The testing of the lesser known fixed oils has been continued with some interesting results. The first to be considered is that of *Celastrus paniculatus.* Malkanguni seeds yield a reddish oil, depositing white fats on standing. The oil is reported to have peculiar medicinal properties and is given as a brain stimulant to students and pundits.

The seeds are small, red and angular—a sample from Madras afforded 43·25 and one from the Punjab 44·7 per cent. of a thick reddish bitter oil. Seven samples of oil received from Burma, Garhwal, Bahraich, Dehra Dun and Gorakhpur, had the following constants: Specific gravity at 50°C. ·942 to ·958; acid value, 34·7 to 101·0; saponification value, 218·0 to 246·7; iodine value, 75·5 to 100·8; Reichert-Meissl value, 41 to 42; unsaponifiable matter; 3·5; insoluble fatty acids; 70·2 to 86·2; melting point of; 35·°5 to 38·°5; neutralisation value, 179·9 to 192·°8; iodine value of; 103·1 to 109·3. The fatty acids of the lead salt insoluble in ether amounted to 37 per cent.; and melted at 54°. The high saponification and Reichert-Meissl values agree with published analyses of the oil of the staff tree (*Celastrus senegalensis*) and spindle tree (*Euonymus europeus*) of the same natural order.

Pyinkado seeds (*Xylia dolabriformis*). The hard seeds of this tree frequent in Burma yield to ether 21·1 per cent. of a yellow non-drying oil melting at 22°. The constants were acid value, 22·0; saponification value, 176·3; iodine value, 89·4; fatty acids and unsaponifiable, 93·3 per cent.; melting at 54°; neutralisation value, 179·4. 31·6 per cent. of the lead salt was insoluble in ether and the liberated fat acid melted at 69°, consisting probably of stearic acid.

Mimusops Hexandra.—The tree is a native of the Deccan and is cultivated in Northern India. Kirni seeds yield a clear yellowish non-drying oil depositing a white fat at 30°. The specific gravity at 40° is 0·905 and acid value 25·5. The constants are: saponification value, 195·4; iodine value, 72·5 ; Reichert-Meissl value, 0·17 ; fat acids and unsaponifiable, 95·4 ; melting at 38°; unsaponifiable, 1·3 ; neutralisation value, 200·5 ; iodine value, 75·6.

Origanum Vulgare.—The minute seeds of this labiate plant have been reported as oleaginous. A sample from Ramnagar, United Provinces, yielded to ether 27·3 per cent. of a drying oil. The oil had an acid value of 11·3, saponification value 194·9, and iodine value 190·5. The iodine value is therefore higher than that of linseed oil, and in this respect resembles the fatty oil of *Perilla ocimoides*, a labiate plant indigenous in India, China and Japan.

Prunus Puddum.—The seeds of the Bird Cherry growing in the Himalayas yield another peculiar oil remarkable for its siccative properties. The oil extracted by ether commenced to form a skin and absorb oxygen as soon as evaporation was complete. Under the circumstances it was difficult to estimate its iodine value. A small sample was crushed in a mill, and the oil treated at once by Hubl's solution showed a value of 172. It dried to a skin in glass in two hours compared with boiled linseed oil which required four hours. The pressed cake and seeds distilled with water afforded considerable quantities of hydrocyanic acid and benzoyl aldehyde (oil of bitter almonds).

Myrobalan seeds and kernels.—The Director General of Commercial Intelligence sent the seeds and kernels of the nut with a view to determining not only the content of oil but also the percentage of protein, carbohydrates, fibre and water. The seeds, it may be mentioned, consisted of the hard bony endocarp with the enclosed kernel.

They were found to have the following composition :—

	Seeds.	Kernels.
Moisture	11·40	9·15
Fat	3·40	35·76
Proteids	2·81	30·18
Carbohydrates	31·84	16·76
Fibre	49·00	2·00
Ash	1·55	6·15
	100·00	100·00
Nitrogen	·45	4·83
Phosphoric anhydride . . .	·29	1·63

Vanguiera spinosa.—The fruits of this tree, the Maina of Assam, are considered to have medicinal properties and are occasionally eaten, but a large quantity is said to produce symptoms of poisoning. No cyanogenetic glucoside or alkaloid was discovered in the fruits. They contained sugar, gum and a trace of tannin. The dried seeds yielded to ether 14·01 per cent. of oil of a semi-drying nature. Its iodine value was 115·07.

Linseed oil.—Four samples of linseed oil from the Gourepore Mills were tested and found to comply with Government standards of oil issued for Admiralty purposes.

Petroleum.—Six samples of lubricating oil were examined for specific gravity and flash point. A report was also made on a sample of bloomless oil imported for mixing with perfumes.

Morhal Resin.—*Vatica lanceæfolia,* Blume, is a large tree of the Eastern Himalaya, Assam, Eastern Bengal and Burma. Little is known about the resin of this tree, but Mason states that it is similar to that of *Vateria indica,* the Piney resin of Malabar. A sample received from Sibsagar was light brown in colour with a brittle fracture. It was soluble to the extent of 48 per cent. in alcohol, 84 per cent. in ether, and almost entirely so in turpentine oil. The acid value of the resin was 15·4, and the iodine value 69·3. The resin has certain desirable properties, but it appears not to be yielded in large quantities.

Rubber.—A sample of Ceara rubber (from *Manihot Glaziovii*) growing in Assam yielded 74·3 per cent. of pure caoutchouc.

Sealing-wax.—Twenty samples of red sealing-wax were examined for the Controller of Printing, Stationery and Stamps. The composition was variable; the proportion of resin ranged from 88·7 to 36; vermilion from 13·1 to 1·6; and loading from 35·8 to 7·6 per cent.

Pistacia Galls.—Leaf-galls of *Pistacia mutica* Fisch. et Mey var. *cabulica* have been received from Baluchistan. Both the leaves and the galls are used for dyeing and tanning. The sample from Baluchistan was made up of leaves on which the galls had been formed, and it was possible to separate the galls from the leaves by cutting them out. A separate chemical examination was then made of the leaf blades and the galls to see how the substance of the leaf had been changed by the aphid.

The results of the analyses are as follows :—

	Leaves.	Galls.
Moisture and volatile matter . . .	7·25	6·85
Resins and wax	7·40	10·57
Tannin	12·85	15·16
Soluble non-tannin	18·88	21·64
Soluble in alkali	27·09	23·41
Albuminoids	9·18	5·50
Fibre	9·50	10·32
Ask	7·95	6·55
TOTAL .	100·00	100·00

The insect according to these analyses has caused a deposition in the galls of resinous and tanning matter and carbohydrates at the expense of the albuminoids. The increase of tannin is not so great as would be expected from the composition of the galls of other species of *Pistacia*.

Canaigre root.—A specimen of the root of the American *Rumex hymenosepalus*, grown in Dharwar, Bombay Presidency, afforded 20·4 per cent. of tannin. This is a better result than was shown last year when the dried root contained 14·9 per cent. In North America this root at different seasons of the year yields from 16·7 to 28·2 per cent.

Inks.—Thirty-three samples of black ink, eleven of red ink, twenty-six of ink powder and three of printers' ink were tested and reported upon for the Controller of Printing, Stationery and Stamps, Calcutta.

Fibres.—Several samples of fibrous substances have been sent to the office to ascertain their value for paper making :—

1. Coir refuse (*Cocos nucifera*) from Malabar.
2. Leaves of *Areca Catechu* from the Dooars.
3. Bark of a tree (*Bauhinia*) from Central Provinces.
4. Stems of grass ("Elkora") from Assam.
5. Sacchi bark (*Aquilaria Agallocha*) from Assam.
6. Do. cleaned and pealed.
7. Do. polished.
8. Rags, raw material.
9. Do. bleached and washed, 2nd stage.
10. Do. do. 3rd do.
11. Do. do. 4th do.

Analyses of the above :—

	Cellulose.	Water.	Ash.
1	37·9	10·7	32·9
2	31·9	...	...
3	48·4	10·5	6·6
4	50·4	7·8	3·3
5	41·8	9·3	10·7
6	53·1	10·2	5·2
7	55·1	9·8	6·1
8	57·2	6·4	11·0
9	65·2	8·0	15·0
10	72·8	5·9	8·5
11	78·7	6·4	2·3

The coir refuse is useless on account of the dark-coloured coarse fibre and large amount of ash. The bark fibre and grass stems have a satisfactory cellulose content and little ash. The Sacchi bark is a natural paper of Assam, and it is interesting to compare the composition of the crude bark with that prepared for writing. The analyses of rags and the paper pulp made from them in four stages are instructive in showing the rise in the cellulose content in the prepared pulp. In addition to these materials 12 kinds of grasses were sent from Kathiawar for the determination of cellulose. This constituent varied from 31·8 to 43·9 per cent., while the ash content ranged from 4·4 to 14·5 per cent.

Paper.—One hundred and eighteen samples of Indian and British made paper were examined for the Controller of Printing, Stationery and Stamps.

Food stuffs.—Flowers of *Pterospermum acerifolium*, Kanak-champa. The flowers are largely eaten by women and children in the month of April, when the tree blossoms. Analysis of the dried flowers reveals the following constituents :—

Moisture	8·50
Ether extract	3·53
Albuminoids	13·25
Carbohydrates	51·55
Fibre	14·57
Ash	8·60
	100·00

Water removed a slimy mucilage, and alcohol dissolved uncrystallisable sugar and a small amount of tannin.

Arisæma roots.—Several species of *Arisæma* are used medicinally in various parts of the Himalaya and South-Western China. They are used sparingly by the Lepchas of Sikkim as a famine food and not uncommonly as a food for pigs. As in other plants of the aroid family the roots contain irritating needles of calcium oxalate which must be removed by boiling before they can be used for human consumption. Specimens of the roots of *Arisæma concinnum*, Schott., and *A. speciosum*, Mart., obtained from Sikkim, have been submitted to analysis. The results show that both species are fairly nutritious, especially *A. concinnum*, as its tubers are richer in nitrogen. The amount of starch present is as high as in many cereals.

Phromnia Sugar.—The secretion of the *Phromnia marginella* consists of a white sweetish substance obtained by the insect from *Elæodendron glaucum*, *Euonymus spp.*, and other plants of the Celastrineæ. The substance has been found to be composed principally of dulcitol or dulcite, an isomeride of mannitol or mannite found in commercial manna.

Isinglass.—The Commissioner of Fisheries in March 1909 forwarded to the Reporter on Economic Products samples of dried crude isinglass prepared in a local factory. He was of opinion that it was much superior to that sold in the market and requested an analysis to be made of it. The sample consisted of the dried sound; it was tough and opaque and yellowish in colour. It had the following composition:—

Water	15·55
Soluble isinglass	72·80
Chondrin	10·30
Ash	1·35
	100·00

The presence of insoluble fibre or chondrin and the unpleasant odour of its solution would render its refinement necessary before it could be used for edible purposes. It would, however, serve some useful purposes in its crude state.

PUBLICATIONS.

FROM THE LABORATORY.

The Composition of Indian Rice by Mr. D. Hooper, in the Agricultural Ledger No. 5 of 1908-09.

Constituents of Roots of *Arisæma concinnum* and *A. speciosum* by Babu Bidhu Bhusan Dutta in the *Journal of Asiatic Society of Bengal*, Vol. V, No. 7, page 197.

Secretion of *Phromnia marginella* by Mr. D. Hooper, in the *Journal of the Asiatic Society of Bengal*, Vol. V, No. 7, page 363.

Silajit and Klipzweet by Mr. D. Hooper, in the *Pharmaceutical Journal*, Vol. 84, page 24.

III.—Statement showing the Heads of Expenditure for the past five years.

TABLE I.

SHOWING THE FUNDS OF THE TRUST FOR THE SECTION.

	Year.	Year.	Year.	Year.	Year.
	1905-06.	1906-07.	1907-08.	1908-09.	1909-10.
	R	R	R	R	R
Gazetted	9,300	9,560	9,880	10,200	10,200
Non-gazetted . . .	9,740	9,420	9,840	9,970	10,090
Grain compensation allowance.	...	558	478	670	332
Travelling allowance	...	...	25	...	...
For bonus of one week's pay to subordinate establishment.	...	...	...	72	...
Laboratory . . .	600	600	600	600	600
Contingencies . . .	2,650	3,020	3,060	3,060	2,390
Purchase of art specimens	6,000	6,000	6,000	6,000	6,000
Interest of deposit in bank	...	...	...	300	300
House rent . . .	...	...	...	3,600	3,600
Contribution towards house rent received from Indian Tea Association.	...	...	...	1,035	1,140
Petty small receipts, sale of disused show cases, etc.	188	63	20	66	42
TOTAL .	28,478	29,221	29,903	35,573	34,694

TABLE II.

TABLE SHOWING EXPENDITURE OF THE TRUST ON THE SECTION.

	Year. 1905-06.	Year. 1906-07.	Year. 1907-08.	Year. 1908-09.	Year. 1909-10.
	R	R	R	R	R
Gazetted Establishment . .	4,214	9,560	9,928	10,200	10,160
Non-gazetted establishment (including grain compensation, etc.)	8,827	10,068	10,614	10,362	10,368
Temporary establishment (Clerks and menials) . .	1,233	866	897	1,085	986
Contingencies	4,214	3,801	3,841	2,796	2,348
Upkeep of Laboratory . .	629	570	403	730	489
Purchase of art exhibits . .	3,870	2,607	6,787	5,555	14,420
House rent, etc. . . .	...	...	476	4,274	4,398
TOTAL .	22,987	27,472	32,946	35,002	43,169

TABLE III.

TABLE OF EXPENDITURE UNDER CONTINGENCIES.

		Year.	Year.	Year.	Year.	Year.
		1905-06.	1906-07.	1907-08.	1908-09.	1909-10.
		R	R	R	R	R
Office	Stationery	131	275	153	155	124
	Printing	38	239	201	220	96
	Stamps	43	86	81	88	64
	Circulating papers	22	32	45	34	33
	Electricity	157	157	105	97	106
	Water coolies	336	336	336	345	339
	Dhoby	24	24	24	24	24
	Servants' liveries	215	159	345	30	190
	Miscellaneous expenses	138	102	155	56	42
Public Galleries	Naphthaline	105	81	110	96	112
	Phenyle	19	30	32	48	44
	Polish	28	52	32	24	15
	Kerosine oil	42	43	58	54	77
	Stores for cleaning	173	290	330	228	218
	Labour for cleaning	356	357	394	352	203
	Furniture and cases	1,804	1,294	1,086	557	444
	Bringing in and putting up exhibits, etc.	416	75	187	298	118
	Purchase of books	30	12	12	12	...
	Bookbinding	137	157	155	78	99
	TOTAL	4,214	3,801	3,841	2,796	2,348

IV.—Statement of Chief Additions to the Economic Court.

ADDITIONS— (652 including)	
RESINS—	
Samples of Lac, various grades	Messrs. Kilburn & Co., through S. Bromley, Esq., Mirzapur, Deputy Commissioner, Hoshiarpur.
Pwe-nyet	Reporter on Economic Products, tour.
Colophony of Pinus longifolia.	Director, Imperial Institute.
GUMS—	
Forms of Asafœtida	Pharmaceutical Society of Great Britain.
Gum of Butea superba	Divisional Forest Officer, Daltonganj.
Gum of Terminalis tomentosa	Extra Assistant Conservator of Forests, Bhandara.
Gum of Sterculia colorata	District Forest Officer, Kurnevorum.
Gum of Swietenia Mahagoni	R. E. P., locally procured.

WAX—

A long series of various grades of bees'-wax.	Director of Agriculture, Bombay.

OILS—

Oils from Origanum vulgare, Fœniculum vulgare, Mentha viridis, Impatiens Balsamina, Lawsonia alba, Toddalia aculeata, Carum bulbocastanum.	Director of Agriculture, Punjab.
Oil of Celastrus senegalensis	Divisional Forest Officer, Betul.
Oil of Cedrus Libani var. Deodara.	Assistant Conservator of Forests, Kulu.
Oil of Melaleuca Cajaputi	R. E. P., locally procured.
Porpoise oil	Deputy Commissioner, Mianwali.
Ghi, various sources	Director, Imperial Institute.
Cotton seed oil	Do. do.

OIL-SEEDS—

Seeds of Bassia butyracea	Extra Assistant Conservator of Forests, Gonda Division, Eastern Circle.
Seeds of Pinus Gerardiana	R. E. P., locally procured.

DYES—	
Cotton flowers . . .	District Officer, Mainpuri.
Pterocarpus santalinus, Chips .	Director, Agriculture, Madras.
Parmelia sp. . . .	Do. do., Punjab.
DYE-ADJUNCTS—	
Bark of Baccaurea sapida .	Subdivisional Officer, Karimganj.
FIBRES—	
Rope of tail of Chungri-Jae .	R. E. P. on tour, Darjeeling.
Fibre of Parrottia Jacquemontiana.	Director, Agriculture, Punjab.
Cocoons-Bombyx mori .	Deputy Commissioner, Gurdaspur.
A series of grades of sunn hemp	Staff of R. E. P. on tour, Pabna.
A series of fibre of Girardinia heterophylla.	Messrs. Shaw, Wallace & Co., Calcutta.
Fibre of Dichrostachys . .	R. E. P. on tour, Melghat.
PAPER AND CLOTH—	
Paper of Aquilaria Agallocha .	Deputy Commissioner, Sibsagar.
Bowl of papier mache . .	R. E. P. Staff on tour, Agra.
Eri silk cloth . . .	Imperial Entomologist, Pusa.
Cotton fabrics . . .	R. E. P. on tour, Nepal.

DRUGS—	
Lavandula dentata . .	R. E. P., locally.
Trichosanthes palmata . . .	Director, Agriculture, Punjab.
Coptis Teeta var chinensis .	S. T. Dunn, Esq., Hongkong.
Peganum Harmala—seeds .	Director, Agriculture, Punjab.
Holarrhena antidysenterica fruits.	Do. do. do.
Smilax medica roots . .	Do. do. do.
Picrorhiza Kurrooa root . .	Director, Agriculture, United Provinces.
Solanum xanthocarpum roots .	Deputy Conservator of Forests, Nimar.
Melia azadirachta leaves .	R. E. P. on tour, Khandesh.
Enicostema littorale plants .	Do. do. do.
NARCOTICS AND POISONS—	
Colchicum luteum root . .	Pratab Sing Museum, Kashmir.
Poisonous Fungi . . .	Forest Divisional Officer, Narsingpur.
Grades of tobacco . .	Superintendent of Agriculture, Station Nadiad, and Director, Imperial Institute.

Foods —

Sugar of Phromnia marginella and insect.	Superintendent, Kumaon Government Gardens, Nainital.
Catanella impudica—seaweed	R. E. P. on tour, Rangoon.
Isinglass	Commissioner of Fisheries, Bengal.
Starch of Curcuma	Director General of Commercial Intelligence.
Arisæma roots	R. E. P. on tour, Darjeeling.
Vangueria spinosa fruit	R. E. P. on tour, Dibrugarh.
Manihot utilissima tubers	Collector of Malabar.
Series of paddy	Director, Land Records and Agriculture, United Provinces.
Setaria glauca seeds	Divisional Forest Officer, Narsingpur.
Dolichos Lablab seeds	Collectors of Chittagong and Noakhali.
Mucuna utilis seeds	Director of Agriculture, Burma.
Chenopodium album seeds	Deputy Commissioner, Gurdaspur.
Sugar, jaggery, molasses, long series from various plants	East India Distilleries, South Arcot.
	Deccan Sugar and Abkari Co., Samalkot.

FOODS—*contd.*

Sugar, jaggery, molasses, long series from various plants—*contd.*	Messrs. Turner, Morrison and Co.
	Deputy Director, Agriculture, Bellary.
	Deputy Commissioner, Balaghat.
	Tahsildar, Brahmapuri, Central Provinces.
	Director of Agriculture, Madras.
	Deputy Commissioner, Kamrup.
	Deputy Commissioner, Bhandara.
	Superintendent of Police, Dinajpur.
	Deputy Commissioner, Cachar.
	Deputy Commissioner, Nowgong.
	Deputy Cmmissioner, Bhopal.
	Manager, Chaklajat Estates, Jalpaiguri.
	Subdivisional Officer, Karimgunge.
	Superintendent, Government Experiment Station, Bankipur.

FOODS—*concld.*

Sugar, jaggery, molasses, long series from various plants—*contd.*	Collector, Barisal.
	Deputy Director, Agriculture, Trichinopoly.
	Director, Agriculture, Burma.
	Superintendent, Agricultural Station, Cuttack.
	Director, Land Records and Agriculture, United Provinces.
SALT—	
Samples from Bundar Abbas .	Dr. H. H. Mann, Poona . .
Do. do. Well brine in South Dariba.	Commissioner, N. India Salt Revenue.
Samples from Sambhar lake .	Do. do.
Do. do. Kalabagh quarries .	Do. do.
Do. do. Warcha mine .	Do. do.
Do. do. Bahadar Khel quarries.	Do. do.
Do. do. Nurpur mines, etc. .	Do. do.
Do. do. Sea salt from Madras	Commissioner of Salt Abkari & Separate Revenue, Madras.
BEADS—	
All kinds of Rudrach seeds and Ocimum sanctum.	R. E. P. locally. Extra Dy. Conservator of Forests, Angul.

V.—Statement of Additions to the Artware Court.

METAL WARE :—

Seven samples of panas or brass lamp.	Purchased from Nepal, through the Resident.
A brass inadalo . . .	Do. do.
A „ krishnadewal . . .	Do. do.
A „ khadalo . . .	Do. do.
Two pairs of brass dogs . .	Do. do.
Two „ „ „ lions . .	Do. do.
A brass phuldan . . .	Do. do.
A pair of brass artis . . .	Do. do.
A pair of „ bottas . .	Do. do.
A brass kapuli . . .	Do. do.
A „ phurwa . . .	Do. do.
A „ artidan . . .	Do. do.
A „ masidan (ink-pot) . .	Do. do.
A „ image of Suraja . .	Do. do.
A „ jhari	Do. do.

METAL WARE—*contd.*	
An enamelled hukka with plate and chillum.	From Lucknow, purchased in Simla.
One old brass and lac hukka bottom.	Calcutta.
A steel sorahi carved and damascened.	Persian, purchased in Calcutta.
One old brass hanging lamp .	North-Western India, purchased in Delhi.
IVORIES—	
An invory painted box containing glass bottles for cosmetics (Moghal period).	Northern India, purchased in Delhi.
An ivory elephant . . .	Amritsar.
A carved shrine with figure of Buddha and two disciples surrounded by figures in ivory.	From Tibet, purchased in Simla.
WOODWORK—	
A pair of Nepalese carved windows	Nepal, through the Resident.
One carved sandal-wood watch-stand.	Presented by Mr. B. L. Chitti, Asst. Curator, Bangalore Museum.
A copy reduced in size of one of the carved wooden triple windows, in the Kumari Darbar, Khatmandu.	Purchased from Nepal, through the Resident.
A copy reduced in size of one of the carved wooden single peacock-pattern windows, Patan.	Do. do. do.

INDUSTRIAL SECTION FOR 1909-1910.

CARVED STONE—	
A rock crystal dagger-handle	From Turkistan, purchased in Calcutta.
FABRICS—	
One smoky brown Turkistan rug	Purchased in Delhi.
One many-coloured Tekka rug	Do. do.
One Persian rug (Shiraz style)	Do. do.
Two Bokhara carpets	Purchased in Calcutta.
Five pieces of lace	Purchased from Nagercoil, South India.
One old Kashmir shawl	Purchased in Calcutta.
Three striped cotton fabrics	From Mirzapur, purchased in Calcutta.
PAPIER-MÂCHÉ—	
A papier-mâché book cover	From Persia, purchased in Calcutta.
LEATHER WORKS—	
A feather embroidered leather box.	From Bilaspur, Simla Hill States, through Mrs. J. W. Mollison.

VI.—Statement of Additions to the Ethnologic Court.

Sola pith ornaments	Calcutta, purchased.
Pipes for tapping thitsi	Burma, from R. E. P.
209 iron styles	Madras, from the Board of Revenue, through R. E. P.
An iron style	Presented by J. Mackenna, Esq., Burma.
A series of implements for paper making.	Deputy Commissioner, Damoh.
Muslin frame for paper making	Director of Agriculture, Burma.
Musical instruments, called Depak-arh Bhiree, Rœthia, used by the Bhils of Khandesh.	R. E. P. from Akrani plateau.
Musical instrument called Bansari	R. E. P., Amritsar.
Earthen jugs called "Kalas"	R. E. P., Halmara, Jorhat.
Japanese sword and dagger	Presented by Mr. A. C. Ghose; Dhubri.
Earing of brass and lac	Darang. Director of Land Records and Agriculture, Assam.

I. HENRY BURKILL,
Acting Superintendent,
Indian Museum, Industrial Section.

22nd April 1910.

Forwarded to the Director General of Archaeology in India, for approval.

D 452

SECRETARY TO THE TRUSTEES,
INDIAN MUSEUM.

28 June 1911.

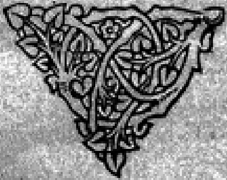
Annual Report

of the

Indian Museum

Industrial Section

for 1910-1911



J.452
80

ANNUAL REPORT

OF

THE INDIAN MUSEUM

INDUSTRIAL SECTION

1910-1911

No. $\frac{77}{X}$.

FROM

I. HENRY BURKILL, Esq., M.A.,
Acting Superintendent, Indian Museum,
Industrial Section,

To

THE TRUSTEES, INDIAN MUSEUM.

Dated CALCUTTA, *the 24th May 1911.*

SIRS,

I have the honour to forward to you the last Annual Report of the old Industrial Section of the Museum. It is divided into parts as follows :—

I.—Administration, p. 2.
II.—Mr. Hooper's Report on the Laboratory, p. 4.
III.—Economic Court, p. 16.
IV.—Artware Court, p. 19.
V.—Ethnology Court, p. 21.
VI.—Library, p. 21.

I.—Administration.

I have acted as Superintendent from the beginning of the financial year, *i.e.*, April 1st, until April 23rd, and again from October 24th to the end of the financial year. During the six months of my leave Mr. D. Hooper acted as Superintendent and Babu Satis Chandra Mukerjee acted for the Curator during the same period. Babu Benode Behari Mukerjee acted as Assistant Curator from April 1st to July 23rd when Mr. E. F. Vieux resumed his duties.

All the three galleries were open to the public throughout the year except at the usual spring and autumn cleanings.

On April 1st, 1911, I handed over charge of the Ethnologic Court to Dr. N. Annandale, Superintendent of the Zoological and Anthropological Sections of the Museum, and of the Art Court to Mr. Percy Brown, Principal of the School of Art, and of the remaining as Reporter on Economic Products to the Government of India, the Officer-in-charge of a reduced Industrial Section wholly germane to my duties as Reporter. The handing over of the Ethnologic collections was done on Mr. Vieux's case-to-case catalogue of the Court, mentioned at the top of page 19 of my last report, and the handing over of the Art collections upon a specially prepared case-to-case catalogue. With both officers, Dr. Annandale and Mr. Brown, an understanding was arrived at that certain specimens from either Court should be returned to the Reporter on Economic Products as soon as ever by the removal of the Art collection to the new wing space to be given back to the new Industrial collection for their accommodation.

In handing over those two galleries, the services of two clerks and eleven menials were transferred.

INDUSTRIAL SECTION FOR 1910-1911.

With the transfer of the Art Gallery to the care of the Principal of the School of Art, the old management ceases by which this Section commanded the services of the Reporter on Economic Products for putting would-be purchasers of Indian art into touch with manufacturers. During the ten years that I have both had charge of the Section and officiated as Reporter on Economic Products, carpets, lace, silver work and art objects of various kinds have been ordered and obtained for known purchasers to the value of approximately Rs. 14,000. This has been done, I believe, without prejudice to the art shops of Calcutta, which could not have supplied the exact articles required. Moreover, as it has been done for the good of Indian art, worthy objects, objects of real value, having alone been obtained.

Of all the classes of objects obtained, carpets have been easiest to get, and artistic pottery hardest, because the carpet-maker is a man of means and education, but the potter ignorant, and even if reliable in his skill, uncertain in his location. I have had many failures in attempting to get replicas in pottery.

The bank account for the old Industrial Section of the Museum cannot be closed until it is possible to get in all the outstanding bills. At the close of the financial year there was a balance in favour of the Museum for the purpose of purchasing artware, but an overdraft against the account for general purposes. Certain funds are due from Government to the Section which will enable the accounts to be adjusted, and finally closed.

Great changes being in view, work within the Section has been confined to old lines. Eleven specimens have been added to the Ethnologic Court, sixty-three specimens to the Art Court and 627 to the Economic Court; but no new show cases and no changes in general arrangement have been made during the year.

The chief of the purchases made for the Art Court were brasses from Nepal selected personally by Mr. Percy Brown. A list of them is to be found on pages 19 to 21. They form a very valuable acquisition.

There is also among the purchases a beautifully worked silver-gilt tray, the margin being set with rubies; the work is Mohammedan, and 120 years ago its possessors were in Southern India.

H. E. Abdul Majid Didi, Mrs. Schneider, Babu S. B. Mukerjee and Babu D. N. Ganguli have been benefactors to the Ethnology and Art Galleries, and the thanks of the Trustees have been cordially given to them. Further, to the firms who have placed exhibits in the Economic Gallery for renovating the objects, especially to Messrs. Harton & Co. and Messrs. Speed & Co., the Trustees' thanks are returned.

The model of the Indigo factory, which was sent to London for exhibition at the request of Messrs. Begg, Dunlop & Co., has been returned to me, and has been placed in position again.

The galleries have in every part had the usual attention and the exhibits are in good condition.

II.—The Work of the Laboratory.

By Mr. D. Hooper, F.C.S.

The chemical work in the Laboratory has proceeded uninterruptedly during the year. Babu Surendra Nath Dey, who has been my assistant since 1904, was transferred in August to a post in the Laboratory of the Sanitary Commissioner of Bengal. The vacancy was filled by Babu Kali

Prosanna Rai, who holds certificates from the Agricultural Institutes at Pusa and Sabour. In January I visited the Exhibition in Allahabad to act as Juror in the Medical and Sanitary Section.

The work of the analytical department, shown by the number of analyses, continues to increase. Three hundred and ninety samples were examined in 1908-09; 444 in 1909-10; and 471 during the year under review.

The materials examined are arranged under the following groups :—

Natural exudations	30
Oils and oil-seeds	47
Dyes and tans	83
Fibres	15
Medicinal products	19
Food stuffs	226
Minerals, etc.	51
	471

Para rubber.—A sample of rubber of *Hevea brasiliensis* from the Darjeeling Himalayan Tea Co., which has its estate on the lower slope of the Darjeeling Himalaya, was of very good quality. It is interesting to know that these trees yield good rubber in that district. The sample contained—

Moisture	·70
Caoutchouc	95·42
Resins	2·65
Protein	·93
Ash	·30
	100·00

Ficus altissima, Bl., *var. typica*, King.—A specimen of the rubber of this tree growing in Assam was sent by Dr.

Hope of the Indian Tea Association. It was of inferior composition and contained—

Water	4·0
Caoutchouc	29·6
White resin	23·0
Yellow resin	42·5
Ash	·9
	100·0

Latex from Burma.—A specimen of latex from "Ka-awe" (supposed to be a Cinnamon tree) growing in Tavoy, Burma, was received. It afforded 2·9 per cent. of coagulum containing 25·2 per cent. of caoutchouc. It is not a very promising rubber material.

Sealing wax.—Twenty-two samples were examined for the Controller of Printing, Stationery and Stamps.

Fish oils.—At the instance of the Honorary Director of Fisheries to the Government of Madras an enquiry has been made as to the nature of the fish oils used in jute batching at the various jute mills near Calcutta, with a view to utilise the fish oil made at Cannanore.

From reports received from the owners and managing agents of the jute mills it appears that only two kinds of oil are used for batching purposes—mineral oil or petroleum and whale oil from Norway, Dundee and Glasgow. In some mills a mixture of both oils is used in the proportion of one to four or one to five of mineral oil. The price of whale oil varies from Rs. 8-1 to Rs. 14-4 per maund, whereas that of mineral oil is from Rs. 2-12 to Rs. 3-4 per maund. Whatever value fish oil may have over petroleum oil the fact remains that the higher price of the fish oil is prejudicial to its more extensive use.

Eleven samples of imported whale oil used in the mills have been tested with the following results :—

	Specific gravity at 23°C.	Acid value.	Iodine value.
1	916·1	32·8	119·4
2	918·1	45·5	125·2
3	914·1	33·9	72·5
4	913·1	59·3	111·2
5	920·1	96·1	152·1
6	912·0	63·4	116·3
7	921·0	52·3	124·8
8	920·1	45·1	126·5
9	918·1	41·5	124·8
10	915·1	20·7	76·3
11	910·0	12·1	46·1

According to Lewkowitsch's "Oils, Fats and Waxes," samples of whale oil have acid values varying from 0·5 to 98·5; as all fish oils are readily oxidizable, this value, as found in commercial samples, is usually high. The iodine values of various brands made in North Europe and America range from 104 to 146. Three samples in the above table are abnormal in containing iodine values below 100; these are probably due to admixture.

The samples of petroleum oil used for jute batching were examined and found to have a specific gravity varying from ·883 to ·925.

Subsequently the Director of Fisheries, Madras, sent six samples of Sardine oil made at Cannanore, for the purpose of distributing them to the jute mills for an expression of opinion as to their value. The oil is obtained probably from *Clupea longiceps* Cuvret Val. The oils were thus described :—

1. First class oil clear.
2. First class with stearin.
3. Second class oil clear.
4. Second class oil with stearin.
5. Third class oil clear.
6. Third class oil with stearin.

They responded to test, as follow :—

	Specific gravity at 16°.	Acid value.	Iodine value.
1	·928	4·18	120·3
2	·931	5·19	118·8
3	·930	14·63	125·0
4	·938	24·35	118·5
5	·930	30·18	130·7
6	·931	37·01	125·6

From reports received it appears that the samples are quite satisfactory in batching jute, although in some of the thicker oils, containing stearin, the oil would require thinning by admixture with mineral oil. Provided that the oil could be supplied at a reasonable rate at an agency established in Calcutta there should be an active demand for the oil in the local jute mills.

Sapium indicum.—This small evergreen tree of the Sunderbans is botanically related to the Chinese Tallow tree (*Sapium sebiferum*), and the seeds were noticed to be very oleaginous. The kernels afforded to ether 50·3 per cent. of a thick greenish-yellow oil, which, when smeared on glass, dried to a skin in two days. The iodine value was 130·4. This oil is worthy of further notice.

Acacia concinna.—The seeds of the soap bean, "Sikkikai" of Madras, are very abundant, and were reported as oil-seeds. They contain, however, only 1·4 per cent. of oil.

Dalbergia cultrata.—The "Yindaik" of Burma yielded to ether 4·5 per cent. of a greenish thick non-drying oil.

Linseed oil.—Three samples of linseed oil for Hongkong were tested for Admiralty purposes and were found to be up to standard.

Turpentine oil.—A sample of refined oil of *Pinus longifolia* from the Government Factory, Naini Tal, was reported to be of excellent quality.

Myrobalans.—A Calcutta merchant conceived the idea of removing the husk of myrobalans from the stones and, as a saving on freight, exporting the former only as a better tanning product than the entire fruit. It was questioned whether the stones which formed more than half the weight of the fruit could be rejected. The analyses show the superior tanning value of the husks and the worthless quality of the stones. Two kinds of myrobalans were tested:—

	Extract.	Tannin.
Husk of Raipur Myrobalans .	65·0	45·8
Stones of Raipur Myrobalans .	6·1	3·7
Husk of Singbhum Myrobalans	59·8	44·6
Stones of Singbhum Myrobalans	7·0	4·8

Ink.—Twenty-eight samples of black ink, eight of red ink and forty-one samples of ink powder were examined for the Controller of Printing, Stationery and Stamps, Calcutta.

Fibres.—There has been some interest in the collection of Indian nettle fibre plants as a source of a substitute for rhea or China grass. The fibre is strong and of good colour and is sought after by textile manufacturers. Seven samples of bark fibre from a Darjeeling nettle (probably *Girardinia heterophylla*), prepared by different processes, were sent for examination. They show how the amount of cellulose is raised by efficient cleaning.

	1	2	3	4	5	6	7
Cellulose .	42·3	42·4	42·9	53·6	53·9	62·6	73·2
Water . .	8·1	5·2	6·8	7·5	6·8	6·3	5·2
Ash . . .	18·2	6·5	9·0	6·2	12·3	3·0	6·2

The following samples of bark and other materials were tested with a view to their being employed in paper-making :—

	Cellulose.
Butea superba, stems	54·7
Sugarcane, refuse	48·0
Alpinia Allughas, "tara," stems . . .	44·2
Phragmites Karka, "nul," stems . . .	40·6
Clinogyne dichotoma, "sitalpati," stems . .	38·2
Jute waste	33·0
Bauhinia Vahlii, bark	31·2

Maize fibre.—The fibrous stigmata of maize found on the cobs or buttias were sent to be tested, but they contain no appreciable amount of cellulose insoluble in alkali.

Food-stuffs (Rice).—In 1909 Drs. H. Fraser and A. T. Stanton (*Studies from the Institute for Medical Research Federated Malay States*) suggested a relationship between the consumption of white rice and the disease called beri-beri.

They found that highly polished rice was more potent in its beri-beri producing-powers than coarser rices containing the aleurone layer. Fowls fed on white rice alone developed polyneuritis in five weeks, but when fed with white rice to which the polishings had been added they remained healthy. Chemical analysis showed that the outer envelope of the rice contained much phosphoric anhydride while it was greatly reduced in milled rices. For instance, parboiled rice contained 0·469 per cent. of P_2O_5 and white rice producing polyneuritis contained only 0·277 per cent. They concluded that beri-beri is a disorder of digestion and is associated with a diet in which white rice is the principal constituent.

Major E. D. W. Greig, I.M.S., was placed on special duty to investigate the outbreak of beri-beri in Bengal and I was invited to assist him by analysing the samples of rice obtained by him during the enquiry and at the same time to ascertain the amount of phosphoric anhydride in the rice and other food-stuffs in general use in India. This work has necessitated the analysis of a large number of specimens of food-stuffs the results of which will be recorded in Major Greig's forthcoming report. It need only be remarked here that samples of Indian rice from which the husk has been removed contain 0·6 to 0·8 per cent. of phosphoric anhydride while the average amount found in polished rice is 0·4 per cent. Some samples which have been highly polished contain no more than 0·26 and 0·22 per cent. A full analysis was made of rice bran or the polishings of the grain which is removed in preparing rice for the market. In this substance an organic phosphorated constituent was removed soluble in hydrochloric acid which is of great value. Analyses were also made of edible products used by the Marwaris who very seldom develop beri-beri, and the richness of their diet in phosphorus was very noticeable. Examination was also made of samples of beef, biscuits, bread, wheat, pulses, pigeon's food, plantains, potatoes and yams to determine the proportion of the phosphoric constituent which in the light of modern research is the elixir of life in all edible substances.

Talsan.—The soft albuminous layer of the unripe seed of the Palmyra Palm (*Borassus flabellifer*) is eaten in July and August. It is a jelly-like translucent substance, sweetish to the taste, and is considered a great delicacy among Bengalis. In a fresh state it contains 92·85 per cent. of water, and the dried substance has the following composition :—

Moisture	1·80
Fat	·68
Albuminoids	4·50
Glucose	63·23
Cane sugar	15·57
Carbohydrates	9·76
Fibre	·76
Ash	3·70
	100·00
Phosphoric anhydride	·46

Edible fern.—A fern sold in the Assam markets and brought from the Khasia Hills was identified as *Asplenium esculentum*, Presl. In a fresh state it contains—

Water	86·15
Albuminoids	3·98
Carbohydrates, etc.	7·75
Ash	2·12
	100·00
Phosphoric anhydride	0·25

Milk products.—In Afghanistan, Baluchistan, Nepal and Tibet a hard form of cheese called "Krut," "Karut" or "Chura" has been known for a very long time. It is made from milk after the butter and the curd is pressed and dried in the sun has been separated. It is used by travellers as a potable concentrated food and keeps its properties during the winter months and for longer periods. A sample from the Nepal frontier contained as much as eighty per cent. of casein, and it may be concluded that similar preparations made in other countries bordering on the north of India consist largely of this highly nitrogenous constituent.

Analyses were also made of the preparation of curds used largely in Bengal called *Chhana* and *Dahi*. *Chhana* has the properties and composition of a rich cream with a pleasant acidulous taste. It contains twice as much casein as average cream and a lower proportion of butter-fat.

Dahi or *Dadhi* is a form of butter-milk in which a proportion of the lactose or milk sugar is converted into lactic acid by fermentation.

Drugs.—Potentilla fulgens, Wall. During a tour in the Khasia Hills last October, the roots of this wild Potentilla were found to be sold in the bazars as an astringent. The roots occurred in bundles and were called "Lyn-mang." They were used in the place of catechu and chewed with betel and pan. The powdered roots yielded 39 per cent. of extract to hot water, and contained 9·2 per cent. of tannin. Other Potentilla roots used medicinally in India are those of *P. nepalensis*, Hook., in the Punjab, and *P. supina*, Linn., in Sind.

Rumex maritima.—The drug called "Bijband" consists of the shining angular seeds (nuts) of species of Rumex which are used as an alterative and aphrodisiac. This drug has been referred by Murray to *Polygonum aviculare*, Linn., and by Atkinson to *Rumex Wallichii*, Meissn. (*R. maritima*, Linn.); some of the seeds sold in Calcutta as "Bijband," and obtained from Dehli, were sown in the Botanic Gardens, Sibpur, and proved to be *R. maritima*. As no analysis of these seeds is on record, they were examined with the following results:—

Water	10·30
Fat	2·57
Tannin	5·10
Albuminoids	10·25
Carbohydrates	61·95
Fibre	6·63
Ash	3·20
	100·00

Podophyllum Emodi.—Three samples of the rhizomes of Indian Podophyllum grown in Hazara and Kashmir were examined for resinoid for a firm of local wholesale druggists. Previously recorded results give 10 and 12 per cent. of resin.

The three samples yielded—

	Hazara.	Kashmir (shade-dried).	Kashmir (sun-dried).
Resin	11·7	13·9	13·7
Moisture	9·1	8·7	8·7
Ash	4·4	4·7	4·1

Opium.—Two samples of opium were examined for the Collector of the 24-Parganas, who suspected one of the samples to be adulterated. The suspected sample contained 47 per cent. of raw sugar.

A case was submitted by a Magistrate in Assam of samples of a drug supposed to be the opium poppy. The plant was identified as *Perilla ocimoides*, the seeds of which have an outward resemblance to those of the poppy.

Minerals, etc. Shells.—During the year an enquiry has been made into the kinds of shells used in India for lime-burning. The opinion is often held that the shells of certain molluscs are more valuable for lime making than others. An opportunity has, therefore, been taken of collecting from various districts shells used for this purpose, obtaining their zoological identification and submitting them to chemical analysis. About 20 shells have so far been identified and analysed, and information has been gathered as to their distribution and uses. The results will be incorporated in an early issue of the Agricultural Ledger.

Briquettes.—The utilisation of rice husk has often been considered and various suggestions made for converting it into fuel and manure. The Secretary to the Financial Commissioner, Burma, forwarded some rice husk briquettes for analysis and comparison with Bengal coal. They were composed of moisture 6·05, organic matter 57·70 and ash 36·75, and had a value of 3297·4 calories. A sample of Bengal coal tested at the same time afforded 6285·5 calories, showing it to be nearly double the fuel value of the briquettes.

Mortar.—The Executive Engineer, 1st Division, in charge of the erection of the extension of the Indian Museum, submitted a sample of the original mortar employed in the construction of the building 34 years ago. It was composed of—

Lime	18·5
Magnesia	1·0
Iron and alumina	1·8
Sand	78·5
	99·8

The mortar was deficient in lime owing to the prolonged weathering.

PUBLICATIONS.

The Soy Bean in India	Agricultural Ledger, No. 3, of 1911.
Medicinal Lizards	Journ. Asiat. Soc., Bengal, vol. VI, No. 6, 1910. 301-3.
Materia Medica Animalium Indica.	Journ. Asiat. Soc., Bengal, vol. VI, No. 10, 1910. 507-522.
The Composition of Indian Yams	Journ. Asiat. Soc., Bengal.
Some Asiatic Milk Products	Journ. Asiat. Soc., Bengal.
Caliature Wood	Nature, May 4, 1911.

III.—Economic Court.

During the year under review 627 specimens were received in this Court through the Reporter on Economic Products to the Government of India. These were registered and displayed in their proper places in the gallery.

Mention is made of the following as of special importance :—

Description of article.	Whence received.
Sugar and secretion from Phromnia marginella.	The Superintendent, Kumaon Government Gardens, United Provinces.

Description of article.	Whence received.
Penaeus monodon, Faber	Reporter on Economic Products' tour collection, Punjab.
Scincus mitranus, Lizard	
Corallum rubrum, Red coral stick	
Tubipora musica, Coral	
Cidaris sp., Fossilised spines	
Bezoar stone	
Silajit	
Fish otaliths (recent)	
Gall stone	
Rhacophorus leucomystax, Bouleng. (Edible frog.)	Mr. W. J. H. Ballantine, Haflong.
Rana tigrina, Daud. (Edible frog)	
Rana limnocharis, Wiegm. (Edible frog.)	
Eaten by the Nagas and naked Kukis in the Cachar Hills.	
Datisca sp., Beetles used in China for diabetes.	Mr. Gravely, Indian Museum, Calcutta.
Rubbers from Urceola esculenta and Rhynchodia Wallichii.	Mr. W. Penny, Bishnath, Assam.
Gutta from Ficus altissima, var. typica.	W. Lennax, Esq., Pullharjhora, Duars, through Dr. G. D. Hope, Calcutta.
Gum from Excaecaria Agallocha	Deputy Commissioner, Mergui, Burma.
Gum from Terminalia Chebula	Divisional Forest Officer, Melghat Division.
Gum from Albizzia Lebbek	Reporter on Economic Products' tour collection, Siliguri.
Oil from Carthamus tinctorius, seeds.	The District Inspector of Land Records and Agriculture, Nasik District, Bombay.
Seeds of Hydnocarpus Wightiana	Messrs. Smith, Stanistreet & Co., Calcutta.
Seeds and fats of Garcinia indica	District Forest Officer, South Canara, Mangalore.
Fruits and fat of Vateria indica	
Oil marked A and B from Pinus longifolia.	Imperial Institute, London.

Description of article.	Whence received.
Cotton seed oil (bleached and unbleached).	Technochemical Laboratory, Gargaon, Burma.
Seed of Camellia theifera . .	Tinuskia, through Dr. G. D. Hope, Calcutta.
Mineral lubricating oil Nos. 1, 2, 3	District Locomotive Superintendent, Bombay, North Western Railway, Samastipur.
Oroxylum indicum, bark . .	Extra Deputy Conservator of Forests, Siwalik Division, Dehra Dun, United Provinces.
Indigofera, hair dye (sold in Patiala).	Director of Agriculture, Punjab.
Ougenia dalbergioides (Rope Nos. 1, 2 and 3).	The Settlement Officer, Jubbalpur, through Deputy Commissioner, Jubbalpur.
Fibre from Trema orientalis .	Southern Range, Extra Deputy Conservator of Forests, Sibsagar Division, Eastern Bengal and Assam.
Rope prepared from bark fibre of Hardwickia binata.	Range Forest Officer, Raver, East Khandesh.
Fibre from Musa marked A, B and C.	Director of Agriculture, Burma.
Fibre from Cannabis sativa (Peshwar Hemp) and Fibre from Crotalaria juncea (6 samples).	Sir George Watt, Richmond, Surrey, England.
Rope from fibre of Berrya Ammonilla.	Assistant Conservator of Forests, Thaungyin Division, through Director of Agriculture, Punjab.
Silk from Eastern Bengal and Assam : No. 1 from Mirganj . . No. 2 from Rajshahi . .	The Imperial Institute, London.
Different stages of paper manufacture.	The Deputy Commissioner, Damoh, Central Provinces.
Ditto ditto .	The Director of Agriculture, Bombay, Poona.
Ditto ditto .	Superintendent, District Jail, Gurdaspur.

Description of articles.	Whence received.
Different stages of paper manufacture.	Superintendent of Jail, Ambala.
Ditto ditto .	Political Agent in Manipur.
Ditto ditto .	Director of Agriculture, Bengal.
Bark paper of different stages from Aquilaria Agallocha.	Deputy Commissioner, Darrang, Assam.
Bark paper of different stages from Broussonetia papyrifera.	Director of Agriculture, Mandalay.
Seed of Strychnos potatorum .	Imperial Forest Economist, Dehra Dun.
Fruits of Solanum Melongena .	Divisional Forest Officer, Akola.
Seeds of Vernonia anthelmintica.	Governor of Kashmir, Srinagar.
Charas from Cannabis sativa .	Deputy Commissioner, Hoshiarpur, Punjab.
Tamarix articulata, Manna .	Census Superintendent, Baluchistan, Quetta.
Plant of Oldenlandia corymbosa	Calcutta Market.
Sliced fruit of Scindapsus officinalis.	
Leaf from Camellia theifera (4 varieties).	District Officer, Dehra Dun.
Sweet potato, Ipomaea Batatas, Tuber.	Messrs. Child & Co., through Director, Geological Survey of India.

IV.—Artware Court.

During the year under report the following additions were made to this gallery :—

(A) *Presented.*

A pair of large and small bangles of imitation gold, by Babu D. N. Ganguli.

A lacquered box from the Maldive Islands, by H. E. Abdul Majid Didi, through Dr. Annandale.

(*B*) *Purchased through Reporter on Economic Products.*

Four carved ivory charms from Tibet.
An enamelled hooka bottom from Bahawalpur.
A shawl with gold embroidery from Kashmir.
A silver attardan.
A steel box inlaid with gold from Persia.

A brass fish vase.
A brass bowl set with turquoises.
A temple-shaped standard lamp.
A pair of hanging lamps.
A brass bowl.
Two brass standard lamps, one small and one large.
A metal book cover.
A brass rice bowl.
A brass candle-stick.
A Buddhist relic box.
A Buddhist bell.
Two brass diapered vases.
A brass peacock lamp.
A brass bird bracket lamp.
A brass *hanuman* lamp.
Two brass vases, lamps with spoon.
A brass duck.
A brass lamp handle.
A brass elephant and figure lamp.
A brass box with the image of a dragon.
A brass box with the image of Vishnu.
A brass box with the image of deities.
A copper box.
A brass dragon handle.
A brass oil cup.
A brass praying Newar figure.
A brass miniature shrine.
A brass figure holding two cups.
A brass figure holding cup on head.
A brass diapered vase.
A rock crystal Krishna.
A pair of brass lions.

From Nepal.

A silk sozni from Persia.
A chased silver gilt jewelled tray.

Four old paintings.	
A Chinese embroidered carpet. A brass perforated pen-holder. A copper trumpet with silver mountings. A serpentine cup on a chased silver stand with cover. A silver girdle set with turquoises. Five brass gilt deities. A Tibetan incense-holder.	From Tibet.

V.—Ethnology Court.

The following additions were made to this gallery :—

Description of article.	Whence received.
Garland of flowers used in worship	Calcutta.
Coloured leaf for the ears . .	From Madras, through Reporter on Economic Products.
Four scented sticks . . .	
A betelnut cutter . . .	
A pitta	
A Burmese marble Buddha .	Mrs. Schneider of Calcutta.
A Burmese book . . .	
A Sitara	Babu S. B. Mukerjee of Calcutta.

VI.—Library.

The number of publications, books, pamphlets and serials received during the year amounted to 335. These were duly registered and placed in their proper places in the Library. Forty-eight volumes were bound. Book-plates were placed in the new books.

The staff has worked well.

I have the honour to be,
SIRS,
Your most obedient Servant,
I. HENRY BURKILL,
Acting Superintendent.

CALCUTTA
SUPERINTENDENT GOVERNMENT PRINTING, INDIA
8, HASTINGS STREET

(87) Encl

✓

২৪/৭/৭৮

Central Archaeological Library,
NEW DELHI 22381

Call No. 069.09(5414)/I.M.

Author— Annual Report of the Indian Museum Industrial

Title— section for the year 1909-10.

Borrower No.	Date of Issue	Date of Return

"A book that is shut is but a block"

CENTRAL ARCHAEOLOGICAL LIBRARY
GOVT. OF INDIA
Department of Archaeology
NEW DELHI

Please help us to keep the book clean and moving.